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6. AUTHOR(S)
Professor Kushawaha

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Howard University
Washington, DC 20059

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13. ABSTRACT (Maximum 200 words)

During the project period, extensive studies of the laser performance of a Nd: and Ho:Tm ions doped in YAG ($Y_3Al_5O_{12}$), KGW ($KGd(WO_4)_2$) host crystals pumped by diode lasers operating in continuous wave or pulsed modes of operation. The diode lasers were temperature tuned to select the appropriate wavelengths to pump the Nd-ions at 785 nm. The laser action from these ions was observed at 1.06 and 2.1 micron, respectively. These laser actions were observed by using various pumping schemes such as end-pumping or side-pumping in diferent configurations such as fixed rod, rotating disks, and moving slabs. These configurations were used only in case of Nd:YAG or Nd:KGW laser crystals. For Tm:Ho:LuAG, only the rod configuration was used at low temperature to observe the laser action at 2.1 micron. A slightly improved laser performance as observed using the rotating disk or moving slab configurations as compared to the fixed configurations. The Nd:YAG and Nd:KGW laser experiments were also performed at very low temperature (approx. 78 K). The laser performance from Nd:KGW at the low temperature was found to be slightly better than the Nd:YAG laser. These results have either been published or submitted for publication in refereed Journals.

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Howard University

Washington DC 20059

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7. LIST OF THE MANUSCRIPTS SUBMITTED OR PUBLISHED UNDER WRIGHT LABORATORY SPONSORSHIP DURING THIS REPORTING PERIOD:

1. Relative performance of a 1.06 μm laser with various Nd doped crystals
V. Kushawaha and L. Major, Optics and Laser Techn. **26** 351 (1994)
2. Effect of Nd concentration on the Nd:KGW laser
V. Kushawaha, A. Michael, and L. Major, Appl. Phys. **B58**, 533 (1994)
3. Diode End Pumped High Efficiency Nd:YAG Laser
V. Kushawaha and Y. Chen, Appl. Phys. **B59**, 659 (1994)
4. Q-switched operation of a SGGM laser
V. Kushawaha and . Michael, Optics and Laser Techn. **27**, 137 (1995)
5. Rotating Disk Diode Pumped Continuous Wave Nd:YAG Laser
Y. Chen and V. Kushawaha, Appl. Phys **B61**, 525 (1995)
6. CW and quasi-CW diode laser pumped Nd:SSGM
V. Kushawaha and Y. Chen, Appl. Phys. **B60** 67 (1995)
7. Efficiency of diode pumped 1.35 μm laser from diode pumped Nd:KGW
V. Kushawaha, Y. Yan, and Y. Chen, Appl. Phys. **B62**, 533 (1996)
8. High efficiency continuous wave diode pumped Tm:Ho:LuAG laser at 2.1μm
V. Kushawaha, Y. Chen, Y. Yan and L. Major, Appl. Phys. **B62** , 109 (1996)
8. Efficient laser operation of diode pumped Nd:$KGd(WO_4)_2$ crystal at 1.067 μm
Y. Chen, L. Major, and V. Kushawaha, Appl. Opt. (In Press 1996)
9. Diode Pumped Moving Nd:YAG and Nd:KGW Slab Lasers
Y. Chen, L. Major, Y. Yan, and V. Kushawaha, Appl. Phys. **B** (Submitted 96)

8. SCIENTIFIC PERSONNEL SUPPORTED BY THIS PROJECT AND DEGREES AWARDED DURING THIS REPORTING PERIOD: None
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10. BRIEF OUTLINE OF RESEARCH FINDINGS:

During the project period (October 1, 1993 - May 15, 1996), we have extensively studied the laser performance of a Nd: and Ho:Tm ions doped in YAG ($Y_3 Al_5 O_{12}$), KGW ($KGd (WO_4)_2$) and LuAG ($Lu_3 Al_5 O_{12}$) host crystals pumped by diode lasers operating in continuous wave or pulsed modes of operation. The diode lasers were temperature tuned to select the appropriate wavelengths to pump the Nd-ions at 808 nm and Ho-ions at 785 nm. The laser action from these ions was observed at 1.06 and 2.1 micron, respectively. These laser actions were observed by using various pumping schemes such as end-pumping or side-pumping in different configurations such as fixed rod, rotating disks, and moving slabs. These configurations were used only in case of Nd:YAG or Nd:KGW laser crystals. For Tm:Ho:LuAG, only the rod configuration was used at low temperature to observe the laser action at 2.1 micron. A slightly improved laser performance was observed using the rotating disk or moving slab configurations as compared to the fixed configurations. The Nd:YAG and Nd:KGW laser experiments were also performed at very low temperature (approx. 78 K). The laser performance from Nd:KGW at the low temperature was found to be slightly better than the Nd:YAG laser. These results have either been published or submitted for publication in refereed Journals.